Treatment of an ilioenteric fistula with an Amplatzer Vascular Plug

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Arterioenteric fistulae often present a diagnostic and therapeutic dilemma for physicians. Traditional therapy consists of open repair, which is often poorly tolerated by patients. As a consequence, endovascular repair, consisting primarily of stent graft exclusion, has been attempted by some as a less invasive approach. We report a patient with an ilioenteric fistula in which hemorrhage was successfully treated with an Amplatzer Vascular Plug (AGA Medical Corporation, Plymouth, Minn). (J Vasc Surg 2011;54:1495-7.)

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CASE REPORT

A 67-year-old woman presented to another hospital with a poorly healing wound on her right foot. An angiogram demonstrated stenoses of her right common iliac and right superficial femoral arteries, and she was treated with angioplasty and stenting of both vessels. She returned to the hospital 1 week later with hematemesis, hematochezia, hypotension, and acute renal failure. A complete blood count at presentation demonstrated a hemoglobin concentration of 4 g/dL. She was intubated, transferred to the intensive care unit (ICU), and underwent aggressive resuscitation with blood products and crystalloid solution.

Once the patient was stabilized, she underwent a noncontrast computed tomography (CT) scan that demonstrated a newly discovered retroperitoneal mass involving the duodenum, the head of the pancreas, and the inferior vena cava. The mass had encased the right common iliac artery and bilateral common iliac veins. Esophagogastroduodenoscopy revealed it had eroded through the duodenum and had an ulcerated appearance, with signs of recent bleeding. Biopsy specimens demonstrated spindle cells consistent with a retroperitoneal sarcoma. She was transferred to the Surgical Oncology Service at Baylor University Medical Center at Dallas to be evaluated for possible resection.

Resuscitation with intravenous crystalloid solution continued for several days after she arrived, until the patient's renal function improved. An intravenous contrast CT scan of the abdomen and pelvis (Fig 1) demonstrated a thrombosed right common iliac stent. The distal end of the stent appeared to extend outside the vessel into the mass and was surrounded by hematoma and air. The iliac artery reconstituted just distal to the end of the stent. These findings were concerning for an ilioenteric fistula caused by vessel rupture into the mass during the placement of the iliac stent, and a vascular surgery consultation was obtained.

The Surgical Oncology Service determined that resection was not possible due to the number of gastrointestinal organs and major vascular structures involved with the mass; however, the melena continued and the patient required additional transfusions. The treatment plan was to proceed with angiography and place a covered stent in the right common iliac artery to exclude the fistula and restore flow through the artery.

The procedure was performed in the cardiac catheterization suite under local anesthesia with intravenous sedation. The left femoral artery was accessed, and a 5F sheath was placed. An aortogram performed with a 5F Omniflush catheter (Angiodynamics, Latham, NY) demonstrated an occlusion of the proximal right iliac artery, with reconstitution of the distal common iliac artery via the internal iliac artery and a large collateral vessel. Attempts to access the right common iliac artery at its origin were unsuccessful.

The right femoral artery was accessed, and a 7F sheath was placed. An attempt was made to cross the iliac occlusion with a hydrophilic wire; however, all attempts were unsuccessful, and the wire was removed. The patient suddenly complained of abdominal pain and became hypotensive. She was given a bolus of crystalloid and vasopressors were started. A retrograde iliac angiogram demonstrated extravasation of contrast into the small intestine (Fig 2).

A Supra Core wire (Abbot Vascular, Redwood City, Calif) was inserted on the right side, and the 7F sheath was exchanged for an 8F 23-cm sheath (Cordis, Bridgewater, NJ). The sheath was advanced into the common iliac artery just distal to the site of the fistula, the introducer was removed, and a 14- by 8-mm AVP was deployed. Completion angiography demonstrated no further contrast extravasation (Fig 3). She was transferred back to the ICU for continued resuscitation.

The patient's hospital course thereafter was unremarkable. She was successfully transferred out of the ICU the day after the procedure. Her hemoglobin level stabilized, and she experienced no additional bleeding episodes. The patient was discharged home on postoperative day 5 with daily dressing changes for her foot

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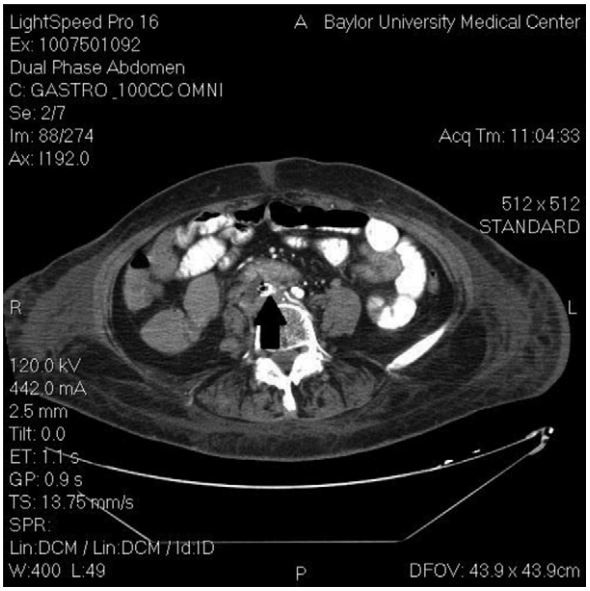

Fig 1. A contrast computed tomography scan of the abdomen and pelvis demonstrates a thrombosed iliac stent with extension into the duodenal mass, surrounded by air and hematoma (*arrow*).

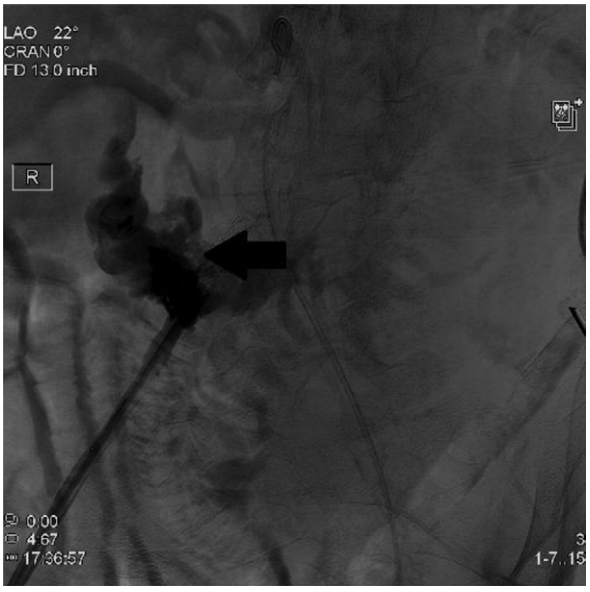

Fig 2. A retrograde angiography demonstrates extravasation of contrast into the duodenum (*arrow*).

wound. She died ~1 month later at home, without any additional bleeding episodes.

DISCUSSION

Fistula development between large arteries and the gastrointestinal tract is an uncommon but often catastrophic event. Fistulae most commonly form between the aorta and the duodenum. Primary aortoenteric fistulae result most frequently from aneurysmal disease but may also be associated with peptic ulcer disease, malignancy, radiation treatment, trauma, diverticulitis, appendicitis, and pancreatic pseudocysts. Secondary aortoenteric fistulae occur after aortic surgery and are observed more often than primary fistulae.

Fig 3. A completion angiography demonstrates occlusion of the fistula.

The standard treatment of an aortoenteric fistula involves excision of all infected graft material and nonviable tissue, repair of the gastrointestinal defect, and revascularization of the lower extremities, which is associated with high morbidity and mortality.[1,2] As a consequence, less invasive endovascular approaches have been reported, with mixed results.[3-6] Most of these procedures consist of stent graft exclusion of the fistula. Antoniou et al[7] systematically reviewed such cases and found 41 patients in 33 reports published from 1990 to 2008 who were treated with stent graft exclusion. Complications were reported in 21 patients, 18 of which were infectious. The authors concluded that stent graft exclusion should not be used as definitive treatment; rather, it should be considered as a bridge to more definitive surgical therapy once the patient is stabilized, especially in patients who demonstrate signs of infection before the intervention.

The endovascular control of hemorrhage has traditionally been accomplished by packing coils in bleeding vessels. More recently, the AVP has been used in place of multiple coils in larger-caliber vessels. The AVP, an embolic device derived from the Amplatzer septal occluder, consists of a self-expanding nitinol wire mesh plug with a diameter of 4 to 16 mm. The diameter of the plug is recommended to be 30% to 50% greater than the diameter of the vessel to be occluded. The AVP has been used in a variety of clinical settings, including ruptured iliac artery aneurysms, high-

flow arteriovenous fistulae, internal iliac artery occlusion before endovascular repair of abdominal aortic aneurysms, and malfunctioning hemodialysis accesses.[8-11] The advantages of the AVP device over traditional coils include quicker, more precise, and more controlled release[8] at a decreased cost.[12]

In this patient, we were unable to exclude the fistula with a covered stent because we could not cross the occluded artery. The AVP allowed us to successfully embolize the vessel quickly, proximal to the site of the fistula. Such an approach should be considered to control hemorrhage in emergencies before definitive repair of the fistula or as a palliative procedure because it does not directly treat the intestinal defect.

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